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Title:	2ND ANNUAL LOS ALAMOS PLUTONIUM METAL STANDARD'S EXCHANGE WORKSHOP, PRELIMINARY RESULTS
Author(s):	Lav Tandon, C-AAC Alice Slemmons, C-AAC
Submitted to:	2nd Annual PMSEW Meeting September 10-11, 2002 Los Alamos NM

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ABSTRACT

The Rocky Flats Plutonium (Pu) Metal Sample Exchange program was conducted to insure the quality and intercomparability of measurements such as Pu assay, Pu isotopics, and impurity analyses. This program was discontinued in 1989 after more than 30 years.

Los Alamos National Laboratory (LANL) has reestablished the Pu metal exchange program. During the first year, five DOE facilities, Argonne East, Argonne West, Livermore, Los Alamos, and New Brunswick Laboratory, Savannah River and the Atomic Weapons Establishment (AWE) at Aldermaston are participating in the program. Plutonium metal samples are being prepared and distributed to the various sites primarily for destructive measurements for elemental concentration, isotopic abundance, and both metallic and nonmetallic impurity levels.

The program is intended to provide independent verification of analytical measurement capability for each participating facility and to allow problems to be identified. Significants achievements in FY02 will be described. Results from category 1 elements and comparisons with Rocky Flats standards exchange metal historical data will also be presented. The roles and responsibilities of LANL and the external laboratories have been defined.

2nd Annual Los Alamos Plutonium Metal Standard Exchange Workshop
"Preliminary" Results

Lav Tandon & Alice Slemmons

Los Alamos National Laboratory, P.O. Box 1663, Los Alamos, NM 87545

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Introduction

Exchange Motivation

- Post qualification requirement

- Method verification and validation

- *How do we compare to Rocky Flats (RF)?*

Approach

- Comparison of results from different methods and laboratories

Significant Achievements-I

Significant Achievements FY02

- Compilation and validation of exchange data.

    - LA-Reports released for the two FYO1 exchanges.

- Participating laboratories:

    - Argonne (ANL), Argonne-West (ANL-W), Atomic Weapons Establishment (AWE) Aldermaston, Los Alamos (LANL), Livermore (LLNL), New Brunswick (NBL) and Savannah (SRS).

    - Memorandum of understanding with the DOE laboratories.

    - AWE under the auspices JOWOG-22 agreements (Focus Area #22/6/14).

- Visit to participating DOE sites.

Significant Achievements- II

Significant Achievements FY02

- Improvements in cutting, shipping and packaging of samples.

- Shipments (April & June)

- Materials

  - 2 Exchange metals used

- Expected Data Set

  - Metal A: 8 sets of analytical results

  - Metal B: 8 sets of analytical results

  - Data sets created for > 40 analytes.

Significant Achievements - III

Significant Achievements FY02

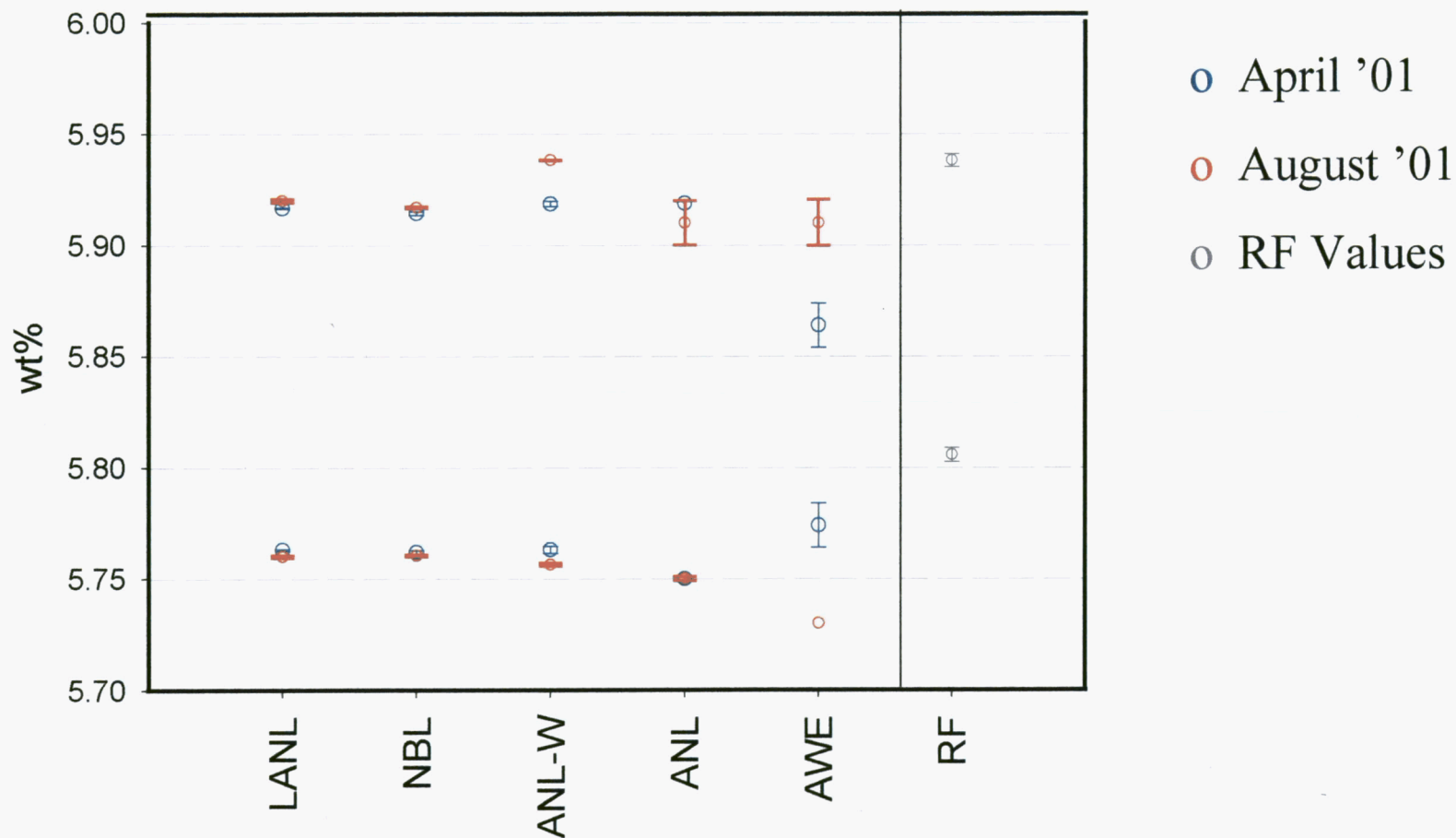- Acquisition of two additional materials to be included in the program in FY03.

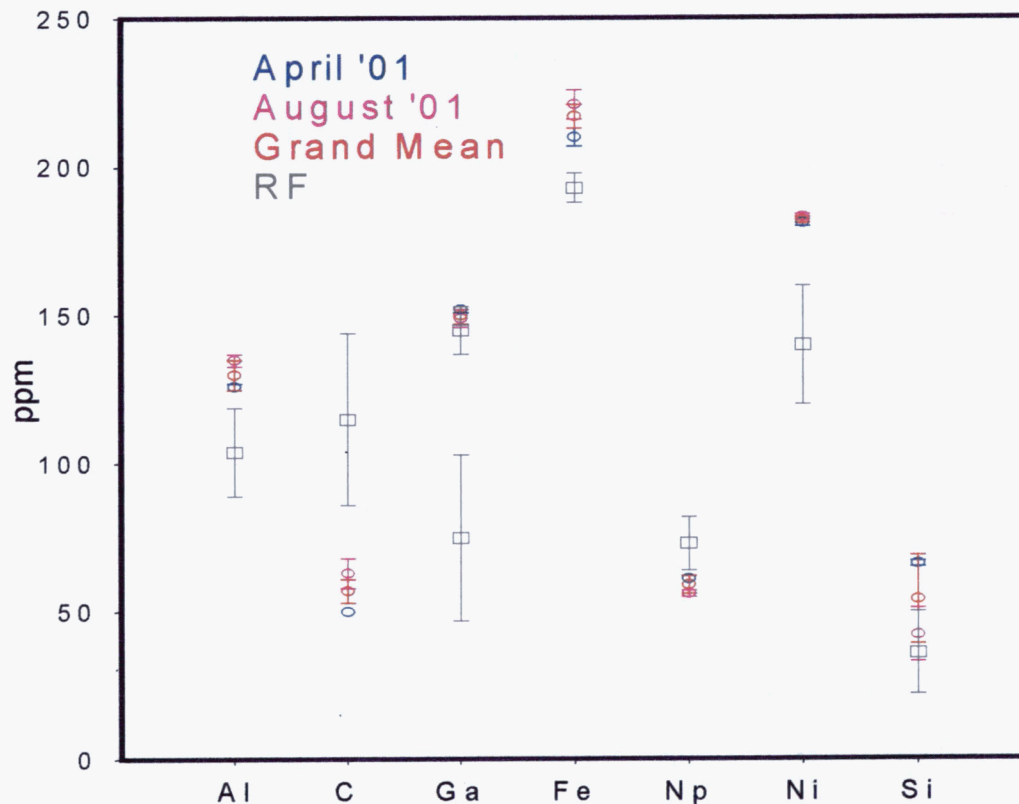# Data Presentation

Metals and Exchange Dates

- Alpha Metals: 442 and 465 exchanged April and August 2001.

- Delta Metals: A and B exchanged April and June 2002.

- Historical Rocky (RF) chemistries available for all the above metals.

Metal 442 & 465 ^{240}Pu Results

LANL vs. RF Comparison (Metal 442)
Various Analytes by their primary methods

RF methods

Al	ES
C	IR
Ga	*AA,ES
Fe	AA
Np	RAD
Ni	**ES
Si	ES

*Ga primary method: CH

**Ni primary method: AA

Data Presentation

Data Treatment

- All the data submitted for radionuclides decay corrected to 1/1/2001.

- Exchange data statistics excludes reported < or > values.

- All the values reported by each laboratory for each method included in consensus values*. Normalized data by treating it as 100%.

* Data included from only current laboratory/techniques (RF not included).

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Data Presentation

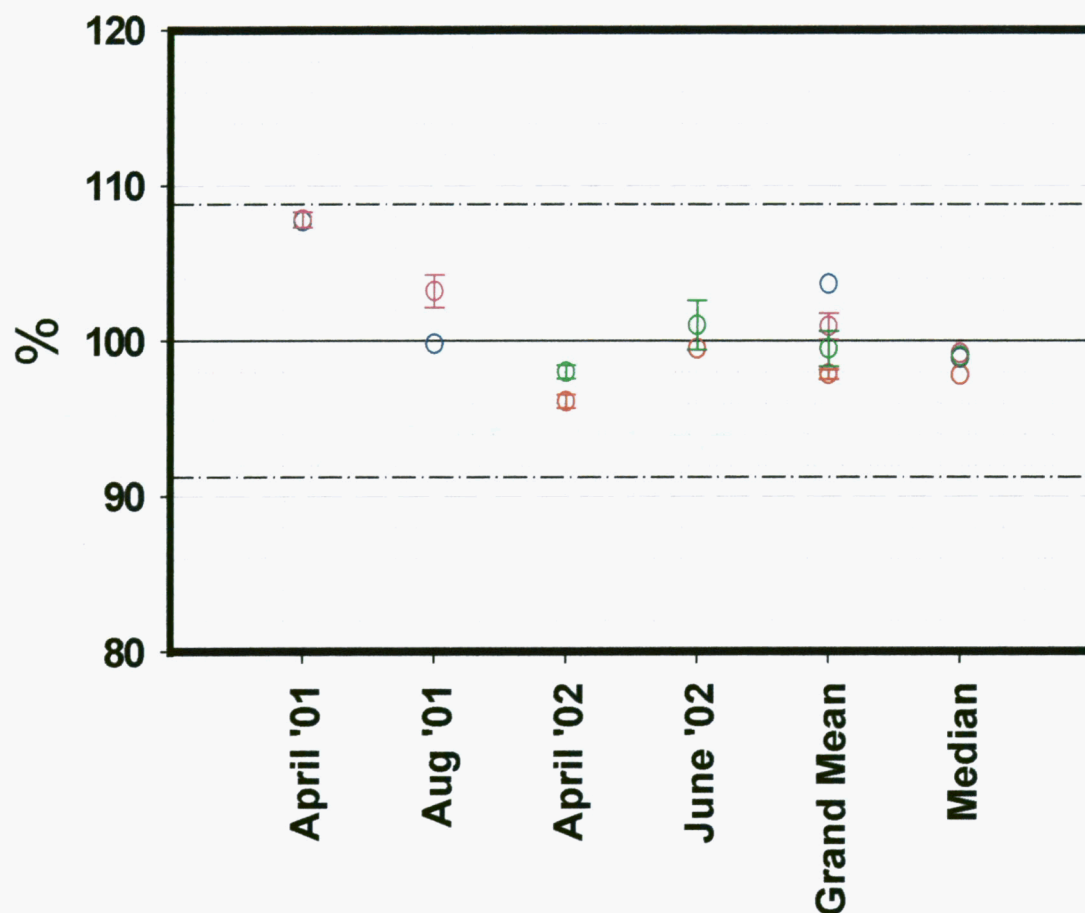**The following GRAPHs compare LANL Primary method result to the consensus values**

•LANL results from each metal were normalized to the consensus values in order to evaluate our performance using data from the different metals.

•Data points have 1σ error bars.

•Included 3σ lines on graph (used the highest consensus-rsd of the 4 metals)

Also plotted:

•LANL grand avg for each metal normalized w/ the consensus values

•Consensus Median – median of all participants' Grand Means.

LANL Americium Results— Normalized to Consensus Values
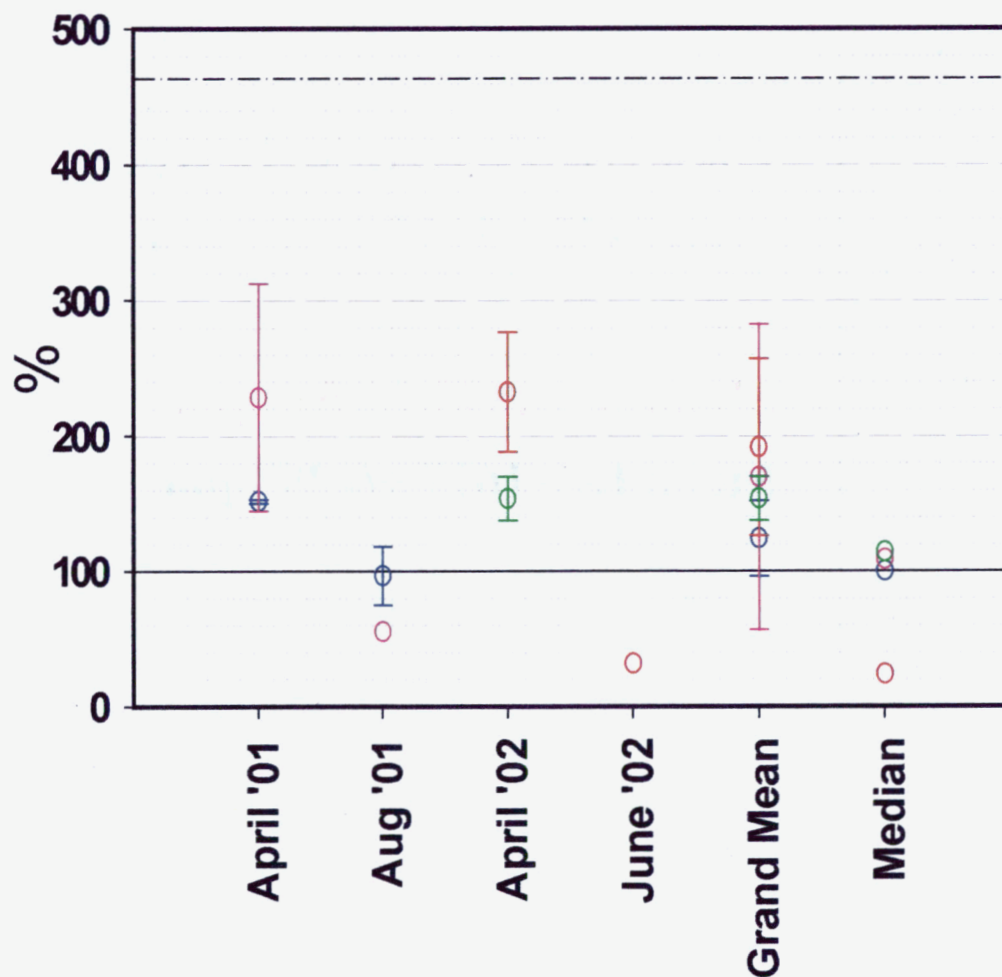
Consensus Values (with 1σ errors)

Metal 442—1164 +/- 19 ppm

Metal 465— 1291 +/- 13 ppm

Metal A—1693 +/- 51 ppm

Metal B— 1677 +/- 29 ppm

LANL Silicon Results—Normalized to Consensus Values
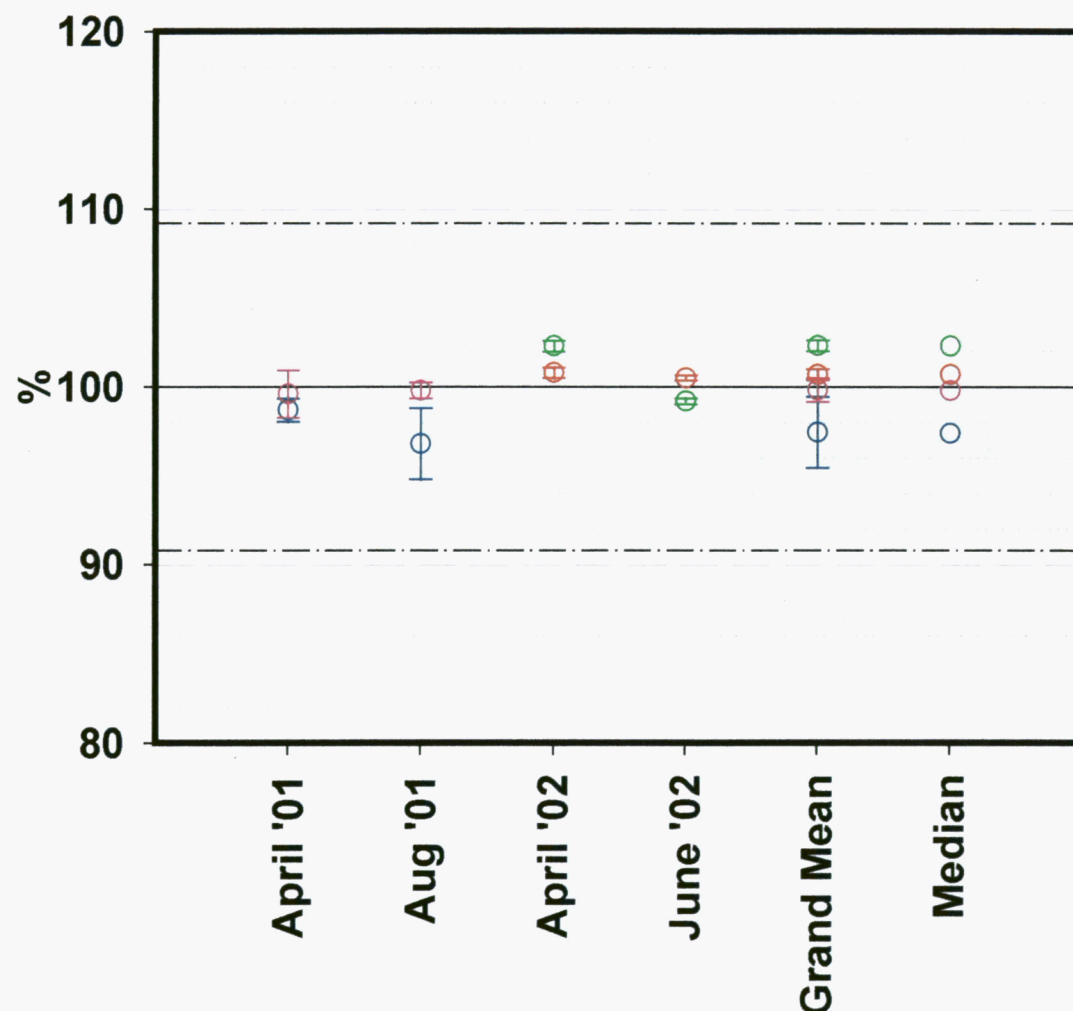

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Metal 442—44 +/- 11 ppm

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LANL Gallium Results—Normalized to Consensus Values
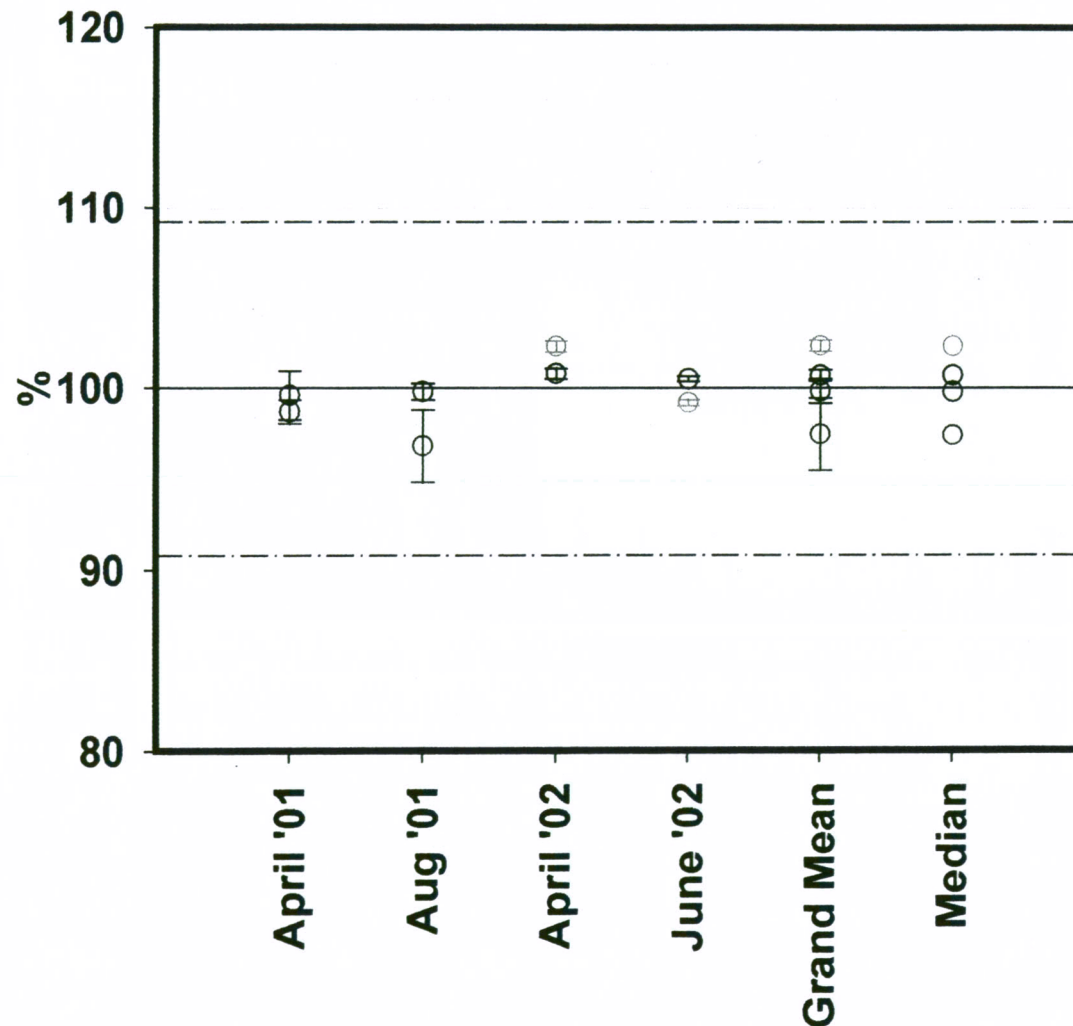
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Metal 442—154 +/- 5 ppm

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Acknowledgements

- LANL: All C-AAC Task Areas including QA Team; Christine Weaver, Steve Long, Becky Guillen, Dave Olivas, Tony Drypolcher, Joel Vargas, Laura Kelly, David Horrell, John Huang

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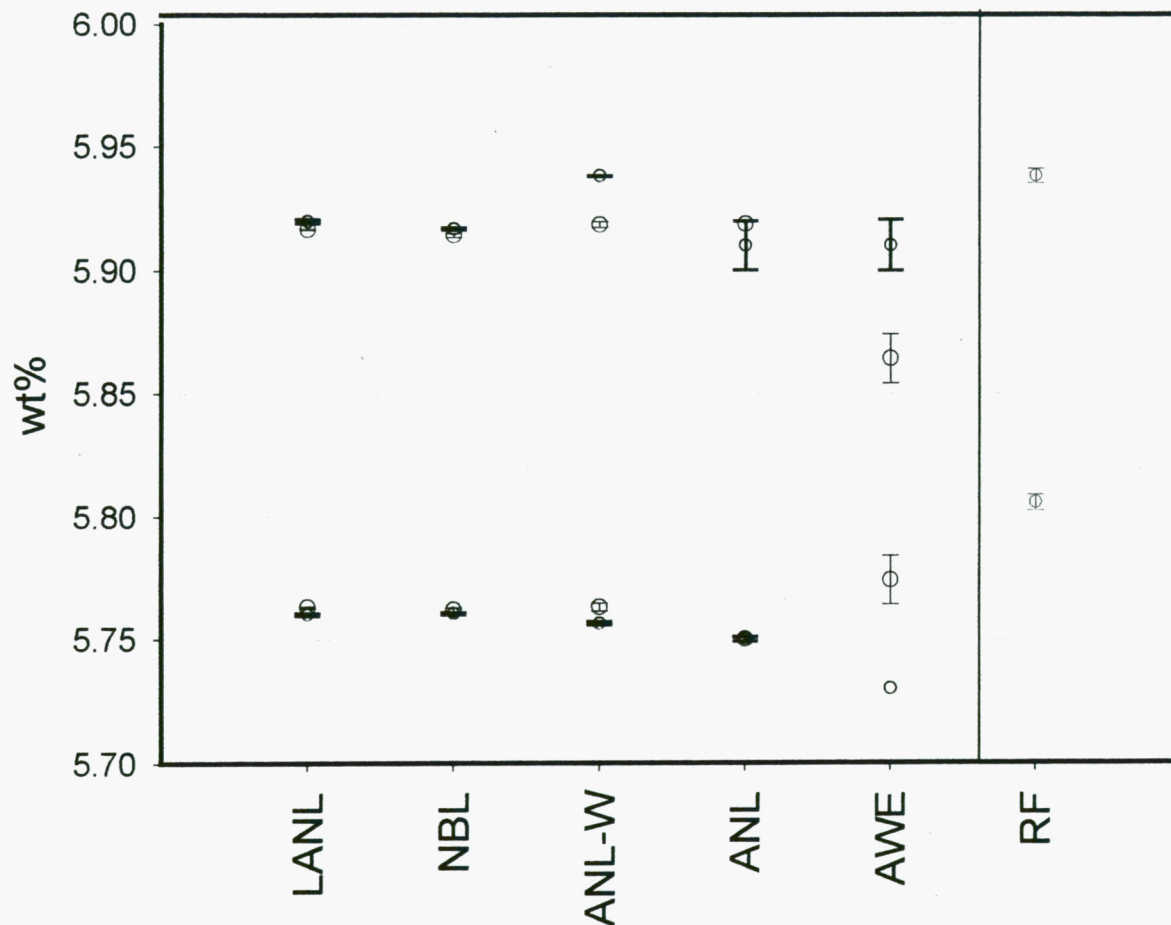- Acquisition of two additional materials to be included in the program in FY03.

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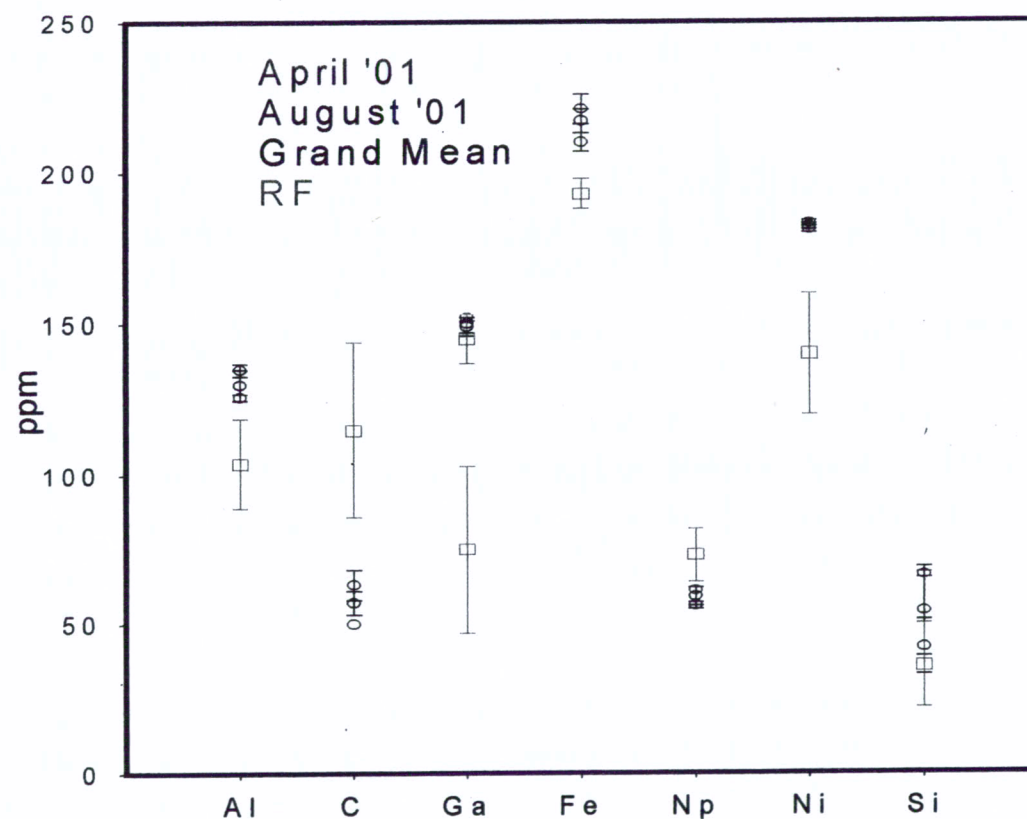•Historical Rocky (RF) chemistries available for all the above metals.

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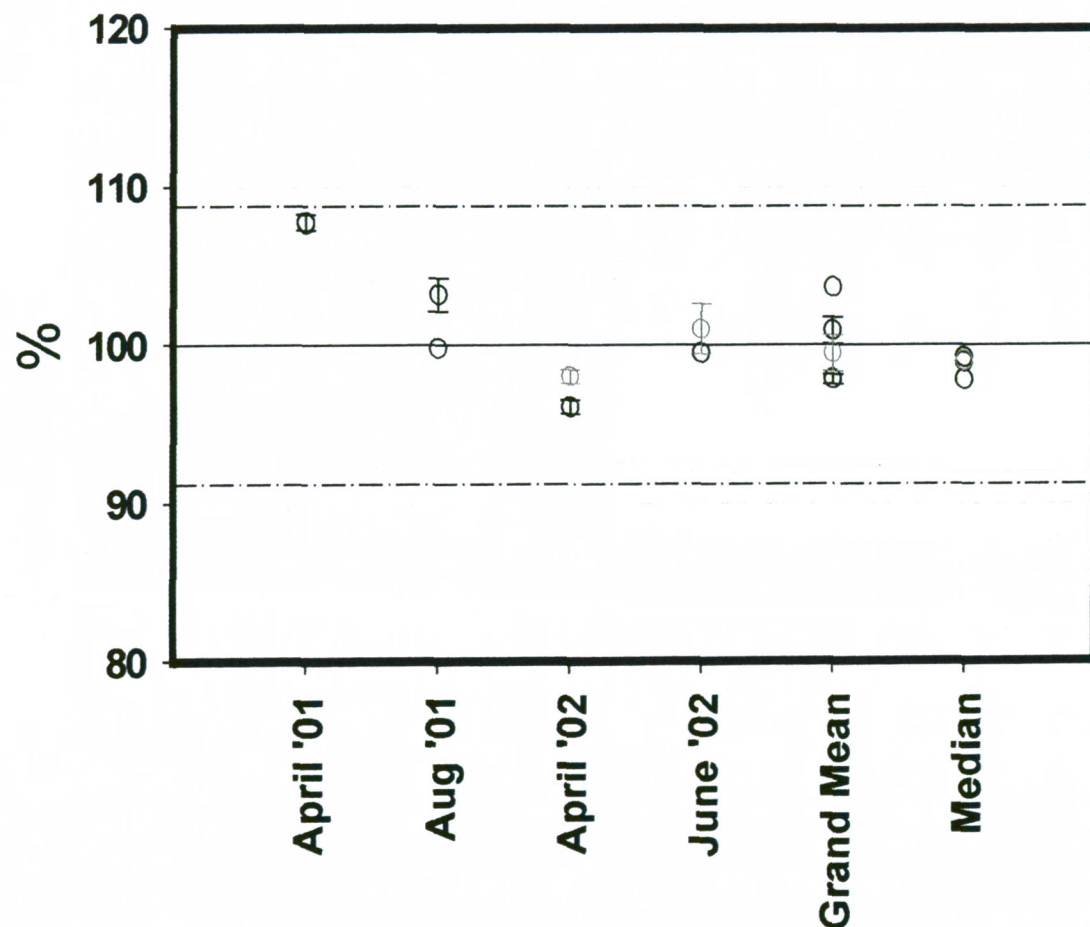
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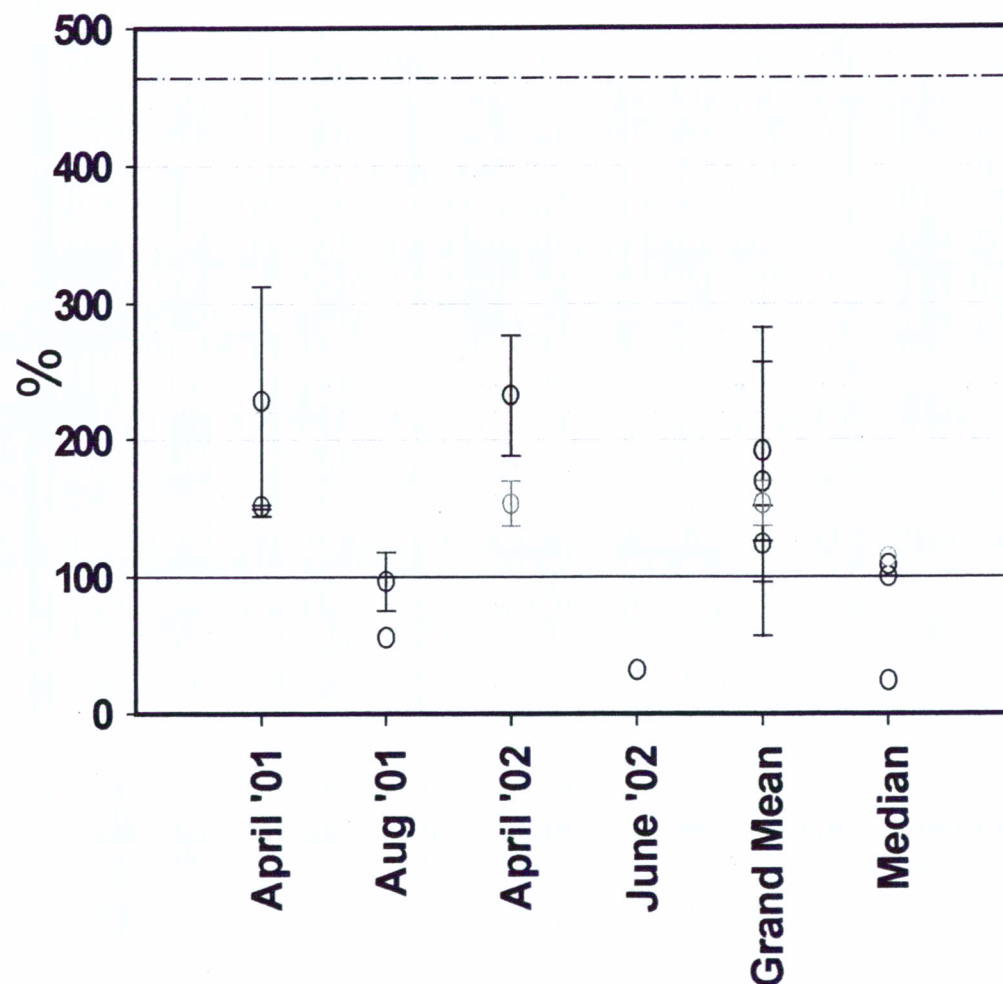**Metal 442—1164 +/- 19 ppm**

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(Chart y-axis: % from 80 to 120. X-axis categories: April '01, Aug '01, April '02, June '02, Grand Mean, Median)

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